



TROUBLESHOOT YOUR NETWORK

If your network connection is slow, acting erratically or not working at all, help is at hand. Louise Simmons explains how to resolve those tricky network nightmares

A network helps you make the most of resources such as an internet connection, a printer, a scanner and other peripherals in your home or office. It should also make collaborating on projects a lot easier, because people can move files around quickly and easily. But what do you do when your network starts playing up?

First of all, there's no need to panic. Although networks can sound very scary, they're not as hard to diagnose and fix as you'd expect. Here we'll talk you through the common problems and explain how to fix them. Even if you find a problem that you can't fix, being able to diagnose where it is and what's gone wrong can save you time and money when you call in professional help.

This guide assumes that you've got a working network with a problem. If you're having difficulties setting up your network in the first place, you should read the 'Networking for

Beginners' feature on this month's cover disc; people looking to share files should read 'How To... Share a folder', which is also on the disc.

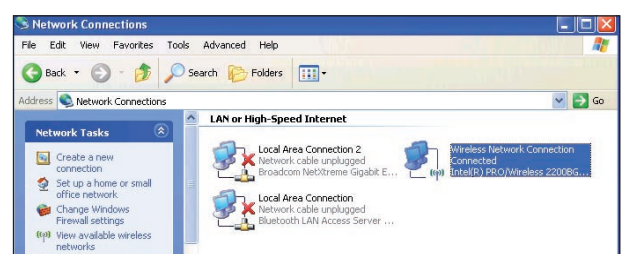
FINDING THE PROBLEM

When diagnosing a network problem, the first job is to determine where the problem is so that you can fix it quickly. This isn't difficult. First, are other computers working properly? If they are, the problem is with your computer; if they're not, then you've got a problem with your router and should restart it immediately. If this doesn't fix the problem, you'll most likely need to get it fixed professionally.

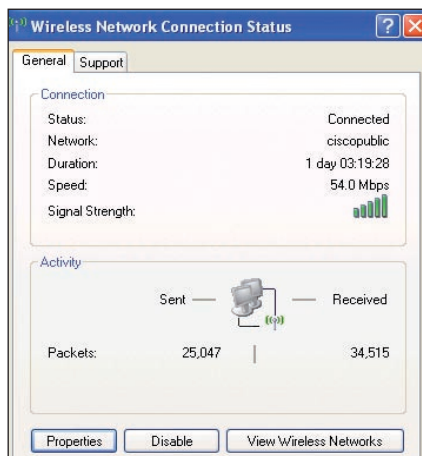
Second, can you connect to other network resources, such as a different printer or

computer? If you can, the problem probably lies with the device to which you're trying to connect. Printers or other network hardware should be restarted to try and rectify the problem (see 'Device manager' on page 130 for tips on how to deal with network devices).

If none of this works, the problem is with the computer you're using. One of the most



▲ Check to make sure that your network adaptor is connected before you try to connect to anything



▲ The Wireless Network Connection Status window shows which wireless network you're connected to and how good the signal is

common networking errors is that the firewall on your computer is blocking access. To make sure that this isn't the problem you should disable the firewall on your PC and those on any other computer while you're trying to fix the problem. Enable it once you've got your network working again; if the problem reappears, you'll need to read the firewall's help files to configure it properly.

How you disable the firewall will depend on the software you're using. If you're using a third-party firewall, such as Norton Internet Security, read its manual for full details. If you're using the Windows firewall, you can disable it easily. In Windows XP, open the Control Panel and select Network Connections. Double-click the icon of the connection you're using, such as Local Area Connection, and click the Advanced tab. Under Windows Firewall click the Settings button and select Off (not recommended). Click OK to apply the settings.

In Windows Vista, you should open the Control Panel and select Network and Sharing Center. Click on the Windows Firewall link on the bottom left of the screen and select Off (not recommended). Click OK. Just reverse these steps to turn it back on.

I CAN'T ACCESS THE NETWORK

The easiest way to check this type of problem is to see what Windows is reporting. From the Start menu, open up the Control Panel and then select Network Connections, or Network and Sharing Center if you're using Windows Vista.

In Windows XP, you'll see an icon for each network adaptor on your PC. If you're connected using a cable, one of the Local Area Network icons should show as being connected; if you're using wireless, the Wireless Network Connection icon should show as being connected.

In Windows Vista, it's slightly different. Under Access you should see the type of access your PC has: Local if you're not sharing an internet connection, or Local and Internet if you are. The Connection type tells you if you're using a wired (Local Area Connection) or wireless network.

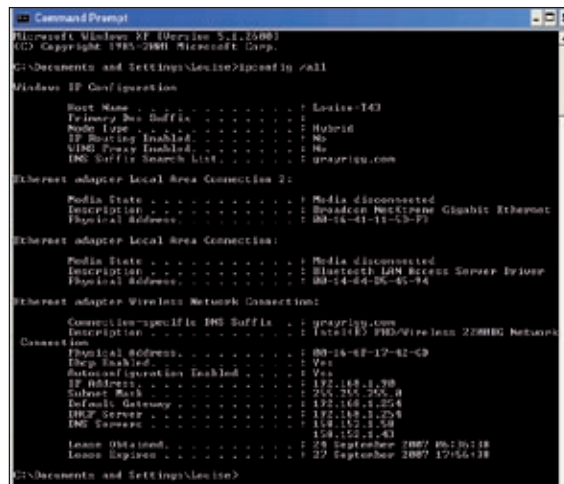
How you progress from here will depend on your connection type. If your wired network is showing as disconnected or it's connected but you still can't access the network, there are a few things you can try. If you're using XP, right-click on the connection and select repair. If you're using Vista, click View status, Diagnose and then click the Reset the network adapter button. These options will disable the hardware, enable it and then try and get a new IP address. If you're still suffering from problems, you need to check the cable.

On the back of your PC there should be a solid green light where the network cable is plugged in. This shows that you have a connection. If there isn't, try unplugging the cable and pushing it in until it clicks. Next, follow the cable to your router or switch. The port it's plugged into, or a status panel, should have a solid green light, too. If it doesn't, check that the router has power, and try unplugging the cable and plugging it in until it clicks. If you still don't get a solid green light,

try plugging the cable into another port on the router (unplug another PC if necessary). If this doesn't work, take the cable from a different PC and try that. If you're still not getting a green light, it's likely that your computer's network adaptor is broken and will need to be replaced. PCI Ethernet adaptors can be bought for around £5. If you've got a status light and Windows says you're connected but you've got network trouble, move on to the next section.

If you're using a wireless network, the steps are a bit different. In Windows XP, double-click the wireless icon to view the Status information. In Windows Vista, click View status. This information will tell you the name of the wireless network you're connected to under Network (also called SSID in your wireless router's settings). If this name matches the name of your wireless network, you're connected to the right place.

Try resetting your wireless router first. If this doesn't solve the problem, try to repair the connection. In Windows XP, right-click the wireless connection and select Repair; in Windows Vista, click View status, click Diagnose and then click the Reset network adapter button.



▲ Running ipconfig /all gives you lots of information about your PC's IP setup

Device manager Fixing other network products

While PCs will probably cause you the most amount of trouble with a network, you also need to know what to do if your network printer, storage or other device stops working. You'll need to have their manuals to hand to find out how to access network settings and make any necessary changes.

PRINTER PANIC

Network printers generally have small LCD control panels that you can use to check and alter settings. Using this you should be able to print out a status page that will show you the printer's current network settings.

Armed with this information you can check that DHCP is enabled, and that a correct IP address has been assigned, as with a PC (see above). If something's amiss, you should reset the printer following the instructions in the manual.

Printers with a wired network port will have status lights, so you can tell if they're

properly connected. Using the techniques described in the main feature, you can use these lights to diagnose a physical fault.

If the problem is with the printer's network port, you'll need to call out an engineer to rectify the problem. If your printer is wireless, follow the setup guide to configure the wireless settings again.

NETWORKED WORLD

It's becoming more common to see lots of other different types of network product, including print servers, to share a printer on the network, and network attached storage (NAS) devices for shared disk space.

For any wired product, check for status lights to confirm that you've got a connection to the network. If you haven't, you should try and change cables and the switch port that they're plugged into. If you can't get any joy and other devices are working, you've probably got a faulty network port.

If this isn't the problem, you'll need to change your settings using the device's web-based management page. If you can't access this or don't know its IP address, don't panic.

Check the device's manual, as it'll tell you how to get hold of this information. Lots of network devices ship with configuration utilities that scour the network and tell you this information. If these don't work, try to reset your device back to its factory defaults. Most will have buttons on the back to do this, but check the manual for the exact steps.

PING PONG

The ping command, as described above, can be used on any network device to confirm that it's on the network. If a device responds to a ping but you still can't access it, there's another problem, and you should try to reset it. If it doesn't respond to a ping, try cycling its power and resetting it to its default settings if the problems persist.



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C:\> Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Louise>netstat -e
Interface Statistics

Received

Bytes      109074941
Unicast packets      219177
Non-unicast packets    4949
Discards            0
Errors              0
Unknown protocols     0

C:\Documents and Settings\Louise>
    
```

▲ 'Netstat -e' displays statistics about the traffic going through your network adapter, and works for both wired and wireless connections

If you found that your network name doesn't match the name of the wireless network, you're connected to the wrong network. To fix this problem, we'll assume that you're using Windows to manage your wireless networks. If you're not and you're using your wireless adaptor's manufacturer's software, you'll need to read its documentation for full instructions.

In Windows XP, click the Properties button and click on the Wireless Networks tab. Select any network listed under Preferred networks that isn't your network and click Remove. Click the Advanced button and remove the tick from the Automatically connect to non-preferred networks box to stop your PC connecting to any unsecured wireless networks it finds. Click Close and you should be left with just your network to connect to. If it's not listed, you'll need to reconnect to it in the normal way.

In Windows Vista, click the 'Manage wireless networks' link from the Network and Sharing Center. This will display a list of wireless networks that your computer will connect to. Select any network that isn't yours and click the Remove button. You should be left with just your network. If it's not there, then you'll need to reconnect to it in the the normal way.

If you're still having trouble with your connection, the problem lies elsewhere and you should move to the next step.

I CAN'T SEE OTHER DEVICES

If you've worked out that your computer is connected to the network but you're still having the same problems, it's likely to be a configuration or software error.

The first thing to do is check that your computer has a valid IP address, as this will confirm that you're on the network. Most people will be using a wireless router, which will automatically hand out IP addresses to computers using the Dynamic Host Configuration Protocol (DHCP). If you're using manual IP address settings, check that you configured your computer correctly.

Sometimes DHCP can go wrong and a computer won't be given an IP address. First, check that your computer is set up for DHCP. In Windows XP, open Network Connections from the Control Panel and double-click the network connection you're using. To get the same view in Windows Vista, open the Network and Sharing Center from the Control Panel and select Manage network connections. Double-click the network connection you're using and click Properties.

For XP and Vista double-click Internet Protocol (TCP/IP) – this is version 4 for Vista – from the 'This connection uses the following items' list. Make sure that both 'Obtain an IP

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C:\> Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Louise>ping www
Pinging www.computershopper.co.uk [194.70.
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 194.70.234.209:
    Packets: Sent = 4, Received = 0, Lost
C:\Documents and Settings\Louise>
    
```

▲ Pinging a website name probably won't work, but it will confirm that DNS is working

address automatically' and 'Obtain DNS server address automatically' are selected and click OK.

To check in both Windows XP and Vista, start a Command prompt from the Start menu (right-click it and select Run as an administrator if you're using Vista). Type 'ipconfig /all' (without quotes). This will list your computer's network settings. If the IP address listing starts with a 169.x.x.x, your computer hasn't picked up an IP address. Check another computer on the network. If it has a real IP address (which is likely to be something like 192.168.2.1), the problem is with your computer. If the other computer also has a 169.x.x.x address, it's a problem across the network.

In either case this should be easy to fix. Just type 'ipconfig /release' and then 'ipconfig /renew' (without quotes). This will attempt to get a new IP address. If this fails, try to use the Windows Repair option, as described in the previous section. If this doesn't work, your router may have used up the number of IP addresses it can hand out. To fix this you'll need to connect to its web-based management page and reset its DHCP server. To find out how to do this, look in your router's manual.

Once that's done, restart all your computers and devices so that they get new IP addresses. If your computer is still getting a 169.x.x.x address, you should use Windows' System Restore (go to Start, Accessories, System Tools) to go back to a date when your computer was working.

If you've got a proper IP address, you need to check that your computers are on the same network. Compare the settings from two

computers. They should both have the same Default Gateway address (this is the IP address of your router, and all network traffic for the internet is sent here). Their IP addresses should start with the same three numbers, followed by different end numbers (192.168.2.2 and 192.168.2.3, for example).

PINGING YOUR DEVICES

Write down the IP address of the computer you want to access. If it's a printer or other network device, you'll need to check the manual to find out how to get its IP address. From your PC, get a command prompt and type 'ping <IP address>' where <IP address> is the address of the device to which you want to connect (ping 192.168.2.3, for example). You should get four replies, showing that you can communicate. If you don't, try pinging your own IP address. If you don't get a reply here, there's something wrong with your computer and you should use Windows Repair option on your network card and perform a System Restore.

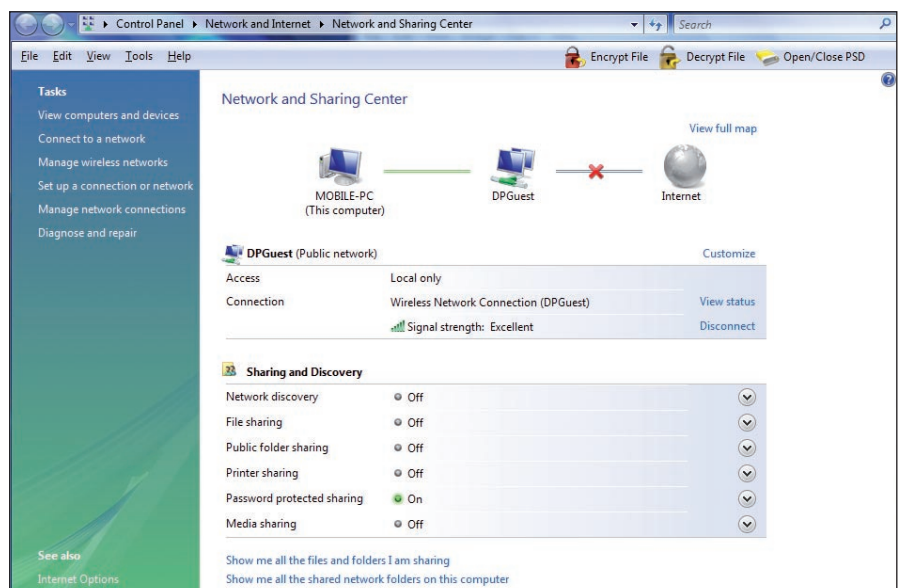
You should also try pinging the Gateway address as listed by 'ipconfig /all'; if you don't get a response from that, there's a problem with your router and you should restart it.

If you still can't communicate with a device, how you proceed depends on whether you've got a wired or wireless network. If you've got a wired network, you should check the cabling to both your PC and the device you're connecting to, as described in the previous step.

If you're running a wireless network, are you trying to communicate with another wireless device? If you are, you need to check your router to see if wireless isolation is turned on. This feature prevents wireless clients talking to each other. Your router's manual will tell you where this option is. Otherwise, the problem could be that your wireless signal strength isn't strong enough, so read 'Wireless woes' on page 132 for more information.

MY CONNECTION IS SLOW

A slow network is one of the most common complaints. This is usually caused by something that is relatively simple to fix, although checking the problem will depend on whether you're using a wired or wireless network.



▲ Windows Vista's Network and Sharing Center will be able to show you information on your current network connection



If you're using wireless, it may simply be that you're almost out of range of the router, as performance drops off the further away you move. In Windows XP, you can check the signal strength by opening Network Connections from the Control Panel. Double-click the wireless connection and you'll see the status information page with Signal Strength displayed. In Vista, open the Network and Sharing Center from the Control Panel. The Signal Strength is displayed under the Connection information. If you have one or two bars on the graph highlighted in green, or the connection says Poor, then move the computer until this improves.

If your network still isn't any faster, then it could be that someone else in your house is using all your bandwidth. Look at the status lights on the router; if you see the wireless light flashing madly, the wireless network is really busy. Get other people who are using wireless to stop what they're doing. If this doesn't fix the problem, read our 'Wireless woes' box below.

For a wired network, check the status lights on the router. If the light for one port is flashing madly, it means the computer connected to it is using a lot of network traffic. Try disconnecting all other devices apart from your computer and the device you want to access. If speeds still don't improve, try swapping cables.

Finally, a lot of problems aren't caused by the network, but by an overloaded computer. Press Ctrl-Shift-Esc and click on the Performance tab. If your CPU usage is high – 90 per cent or above – this could be the problem. If you're trying to connect to a PC, do the same

thing on that computer, as high processor utilisation here could be the problem. Try quitting all running applications and see if the CPU usage goes down.

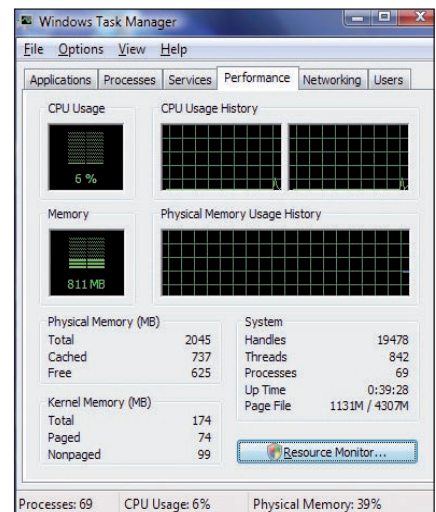
I CAN'T ACCESS THE INTERNET

Sharing an internet connection is one of the best uses of a network, but it's also the cause of a lot of errors. If you can access other devices on your network but can't connect to the internet, the problem is either with your router or ISP.

There should be a status light on your router to show that it's connected to the internet. If this isn't lit, connect to the router's management page and follow the instructions to reconnect to the internet. Taking the power lead out of the back and leaving it for a few seconds before plugging it back in might fix the problem. If not, contact your ISP to find out if there's a problem.

If your router says it's connected to the internet but you can't access websites, there could be a Domain Name Service (DNS) server problem. DNS converts web addresses, such as www.computershopper.co.uk, into IP addresses, such as 194.70.234.209.

To test this in XP and Vista, type nslookup <websitename> (for example, nslookup www.computershopper.co.uk) at the command prompt. Under the Non-authoritative answer you should get the IP address, or addresses, of the website to which you're trying to connect. If there's a DNS problem, you'll get an error message. Try rebooting your router and, if the problem persists, contact your ISP.



▲ Check CPU utilisation, as high usage can be the cause of a seemingly slow network

Finally, try typing 'ping websitename' at the command prompt. If you get a reply, then your network is working. Note that some websites, such as www.microsoft.com, are set up to ignore ping requests. To test a network, therefore, we'd first try pinging www.google.co.uk. If you get a reply here then there's probably an intermittent network fault with your ISP, or the website you're trying to connect to is suffering problems.

If you're still unable to connect to the internet, you'll need to get in touch with your ISP or check its status page on the internet to see if there are any known issues. **CS**

Wireless woes Getting a more reliable signal

Wireless networking is one of the greatest inventions, as anyone who's used their laptop in the back garden will testify. However, they're often the source of much frustration, often disconnecting at random, becoming infuriatingly slow or refusing to work at all.

It doesn't have to be like that, though. A few tweaks to your settings can often turn an infuriating wireless connection into a reliable one. You'll need to check your router's manual to find out how to implement these tricks and access the router's web-based management page. Configuring your router is also best done using a wired connection, as you won't get disconnected if the router has to reboot or when you modify wireless settings.

If you don't have enough spare ports, simply disconnect a PC or other device for the duration of the configuration. You'll need a wireless laptop to hand, too, so that you can test your connection every time that you change a setting.

CHANGING THE CHANNEL

Wireless networks operate on the 2.4GHz radio band. This is divided into 14 channels, 13 of which are usable in the UK. A lot of wireless problems are caused by using a congested channel. Simply changing this can help improve matters.

Of the 13 channels that can be used only numbers 1, 6 and 11 should be chosen, as these don't overlap. Choosing channel 2, for example, would mean that you'd get interference from devices running on channel 1. The real trick is in picking an uncongested channel.

To do this, download and install Network Stumbler from www.netstumbler.org on a computer with a wireless adaptor. Run the application from the Start menu and it will take over your wireless connection and scan for wireless networks. Leave it for a couple of minutes to build an accurate list. In the main window, click on the Chan tab to sort the list by channel. All you have to do now is see which of

channels 1, 6 or 11 has the lowest amount of traffic on it, and set your router to use that.

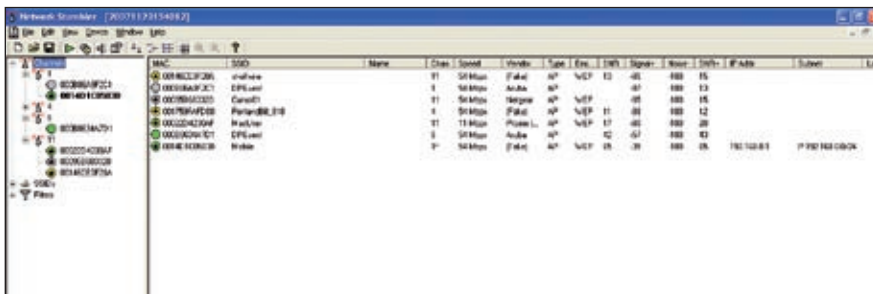
Test your network and, if it's no more reliable, then change the channel to the second least congested one.

TURBO POWER

Draft-N and some turbo-mode and MIMO routers use a technique called channel bonding, where two wireless channels are used to double the wireless network's speed. These can cause problems, though, so if you're suffering problems you should look at turning these modes off.

Most wireless routers will have a 54g protection mode (or something similar). Turning this mode on will reduce performance, but it will increase stability in areas where there's a lot of wireless traffic. If Network Stumbler shows that you've got lots of other wireless networks around you, try turning this mode on.

If range is your problem, there are several tricks to try. First, if your router supports it, make sure that its wireless power is turned up to maximum. Second, try moving the router, or mount it as high as possible. Finally, you may be able to change your router's antennas for those with a higher gain, which will increase signal strength. Antenna power is measured in dBi. Normal routers typically have 4dBi antennas, but you should look to get 7dBi antennas to see an improvement. These will typically cost around £30.



▲ Network Stumbler can help you choose the best wireless channel